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Issued November 17, 1910.

U. S. DEPARTMENT OF AGRICULTURE.

FARMERS' BULLETIN 427.

BARLEY CULTURE IN THE SOUTHERN STATES.

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WASHINGTON:

GOVERNMENT PRINTING OFFICE.

1910.

LETTER OF TRANSMITTAL.

U. S. DEPARTMENT OF AGRICULTURE,
BUREAU OF PLANT INDUSTRY,
OFFICE OF THE CHIEF,
Washington, D. C., July 27, 1910.

SIR: I have the honor to transmit herewith and to recommend for publication as a Farmers' Bulletin a manuscript entitled "Barley Culture in the Southern States," prepared by Mr. H. B. Derr, Agronomist in Charge of Barley Investigations, under the direction of Mr. M. A. Carleton, Cerealist in Charge of Grain Investigations.

There is need in the South for winter grain crops to use in the rotation with cotton and corn as cover crops to prevent washing and to furnish winter pasture. One of the best crops for this purpose, though it is at present little known, is winter barley. Spring barley can also be grown in some sections of the South for grain or forage. The culture of barley in the South is somewhat different from that in other sections of the United States. As the value of this crop for feeding and the conditions necessary for its best success are not generally understood, it is believed that their presentation in this paper is of value and that its publication will increase the popularity of the crop in the Southern States. The methods of cultivation herein described are intended for the production of barley for feeding rather than for malting.

Respectfully,

WM. A. TAYLOR,
Acting Chief of Bureau.

HON. JAMES WILSON,
Secretary of Agriculture.

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BARLEY CULTURE IN THE SOUTHERN STATES.

INTRODUCTION.

Barley ranks fourth in production among the cereals in the United States, but is little cultivated in the South. It was one of the leading grain crops of the early colonists of Maryland, Virginia, and North and South Carolina, but wheat has largely replaced it. Prior to 1892 nearly all the Southern States were included in the statistics of barley production issued by the United States Department of Agriculture. Since that time, however, owing to the small acreage grown, the States of North and South Carolina, Georgia, Florida, Alabama, Mississippi, and Louisiana have been omitted from the annual statement.

Table I gives the acreage, production, total farm value, average yield to the acre, and average price per bushel of barley produced in the Southern States, as far as statistics are available:

TABLE I.—*Barley production in the Southern States, 1909.*

State.	Acreage.	Production.	Total farm value.	Average yield per acre.	Average price per bushel.
	<i>Acres.</i>	<i>Bushels.</i>		<i>Bushels.</i>	
Maryland	1,000	32,000	\$20,000	32.0	\$0.64
Virginia	3,000	86,000	61,000	28.5	.71
Kentucky	1,000	24,000	18,000	24.0	.76
Tennessee	1,000	24,000	19,000	24.0	.79
Texas	4,000	78,000	78,000	19.4	1.00

The figures presented in Table I are for the grain crop only. No statistics of the quantity of barley sown in the South for hay, soiling, or pasture purposes are available. From the reports received, its use for these purposes is rapidly increasing. When the value of the grain for feeding and of the plant as a soiling, cover, and pasture crop is more fully understood, barley will probably again become one of the prominent crops for the South.

VARIETIES OF BARLEY GROWN IN THE SOUTH.^a

WINTER BARLEY.

Winter barley is cultivated in the South for grain, hay, and pasture. At present the most popular variety for grain production is Tennessee Winter, a six-rowed, bearded barley which was selected and improved by the Tennessee Agricultural Experiment Station and has been widely distributed in recent years by the Office of Grain Investigations of the Bureau of Plant Industry. A similar variety known as Union Winter is grown at the Tennessee station

^aThe word "variety" is here used in the ordinary commercial sense, and does not refer to distinct races or pedigreed strains.

and sometimes gives a larger yield than Tennessee Winter. Union Winter is also grown at the Virginia Agricultural Experiment Station.

A winter variety of hooded^a barley (see fig. 1) has been grown for several years at Durham, N. C. Several hooded varieties have also been successfully grown in an experimental way on the Arlington Experimental Farm, near Washington, D. C. This type will be of great value when once firmly established. Spring hooded barley has been grown in a limited way in the South. While it can be grown as a grain crop in the Piedmont region and the higher portions of the Southern States, it is recommended only as a hay

or soiling crop, for which it is superior to any other variety.

SPRING BARLEY.

Bearded barley as a spring grain crop is not generally adapted to the Southern States, as has been demonstrated at several of the agricultural experiment stations and experimental farms. At the Maryland Agricultural Experiment Station^b a comparative test was made between the two-rowed and six-rowed spring barleys and the six-rowed winter barley. The two-rowed spring barley yielded at the rate of 24.4 bushels and the six-rowed

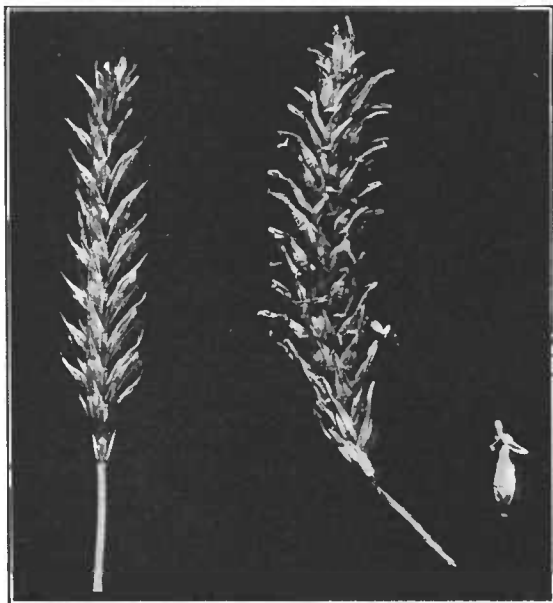


FIG. 1.—A head of awnless and one of hooded (beardless) barley.

spring barley at the rate of 29.2 bushels, an average of 27.7 bushels for the spring varieties. The average from three half-acre plats of winter barley was 50.5 bushels, or 22.8 bushels more than that from the spring varieties. The yields of the spring varieties in this experiment were far in excess of those of spring barley obtained elsewhere.

In 1908 nearly two hundred varieties and selections of two-rowed and six-rowed and of bearded and hull-less barleys were sown by the writer on the Arlington Experimental Farm. The soil and climatic

^a The name "hooded" is proposed for the class of barleys now known as "beardless," owing to the fact that the varieties so known are not strictly beardless. In these barleys the flowering glume is prolonged into a hooded projection which takes the place of the awn upon the bearded varieties. A true awnless (beardless) variety has been developed by the Office of Grain Investigations of the Bureau of Plant Industry; hence the necessity for the change of name (see fig. 1).

^b Bulletin 28, Maryland Agricultural Experiment Station.

conditions were favorable, and good growth was made by many of the varieties. The greater portion, however, failed to mature grain, but would have made excellent hay.

Hooded barley can be grown as a spring grain crop on the clay and loam soils of the Piedmont region and higher elevations of the South. The yield, however, is usually not as satisfactory as that of the Tennessee Winter variety. At Mountainville, Tenn., spring hooded barley was sown broadcast on river-bottom land on February 1 at the rate of $1\frac{1}{2}$ bushels to the acre. The crop was ripe on May 15, and gave a yield of 40 bushels per acre. This large crop was no doubt due to the care used in the selection and preparation of the soil and seed.

SOILS ADAPTED TO THE CROP.

While barley can be grown upon most of the soils of the South, a fertile, well-drained clay or loam will produce the best grain crop. These soils will also give better results when barley is grown for winter pasture. The strong, vigorous growth necessary for producing a heavy hay crop is also made on the heavier soils. For hog pasture or for fall or spring soiling the crop can be grown on the lighter soils.

FERTILIZERS FOR BARLEY IN THE SOUTH.

The appearance of the growing crop is a good indication of the kind of fertilizer needed. If the plants make a rapid growth and are of a rich green color it indicates that there is sufficient nitrogen in the soil to make a crop. If the growth is slow and of a poor color it indicates a lack of nitrogen and possibly a sour soil. If the plants make a good growth but the stems are weak and the heads small and not well filled, the need of phosphoric acid and potash is indicated. Many of the soils of the South are deficient in nitrogen and phosphoric acid. Potash is generally less needed than the two former, although on worn-out soils a complete fertilizer is necessary. Where cowpeas and green manures are plowed under and considerable humus is formed, the purchase of nitrogen, which is the most expensive of these three elements, can be largely avoided, thus reducing the cost of fertilizers.

The uses and value of fertilizers and lime are discussed by Dr. S. A. Knapp^a in a recent publication. On rich lands it is advised to use 3 parts of acid phosphate and 1 part of cottonseed meal. On medium soils 1 part of cottonseed meal to 2 parts of acid phosphate will give good results, while on thin or impoverished soils equal quantities of cottonseed meal and of acid phosphate are recommended.

Where a complete fertilizer is deemed necessary it is advised that it contain from 2 to 3 per cent of nitrogen, 8 to 10 per cent of available phosphoric acid, and from $1\frac{1}{2}$ to 2 per cent of potash. Doctor Knapp states that on some lands a fertilizer containing 14 per cent of acid phosphate will be profitable. On the clay soil of the Arlington Experimental Farm, where cowpeas and rye are plowed under as green manures, in addition to barnyard manure, 200 pounds of acid phosphate per acre has given excellent yields with wheat, barley, and oats.

^a Commercial Fertilizers: Their Uses and Value. Document No. 441, Bureau of Plant Industry, U. S. Dept. of Agriculture.

THE USE OF GREEN MANURES.

Plowing under cowpeas (fig. 2) is an excellent method for building up worn-out soils, as it adds plant food and improves the physical



FIG. 2.—Plowing under cowpeas to improve the soil.

condition. If this is done in August and the land is rolled and finished with a planker followed by a harrow, an excellent seed bed



FIG. 3.—Plowing under crimson clover to improve the soil.

for winter barley is produced. Crimson clover sown in the fall and plowed under in the spring (fig. 3) is one of the best methods for

improving the soil in the South. When well turned under, decay sets in rapidly and the fertilizing ingredients are soon made available as plant food. The humus thus added to the soil improves the physical condition and increases the water-holding capacity of the soil. Both cowpeas and crimson clover add nitrogen to the soil.

In some portions of the South rye is sown in the fall and plowed under as a green-manure crop in the summer. Rye volunteers badly, however, and when once introduced on the farm is likely to cause trouble through the mixing of the grain.

PREPARATION OF THE SOIL.

The proper preparation of the seed bed for barley is important in order to get the best results. From careful observations it seems

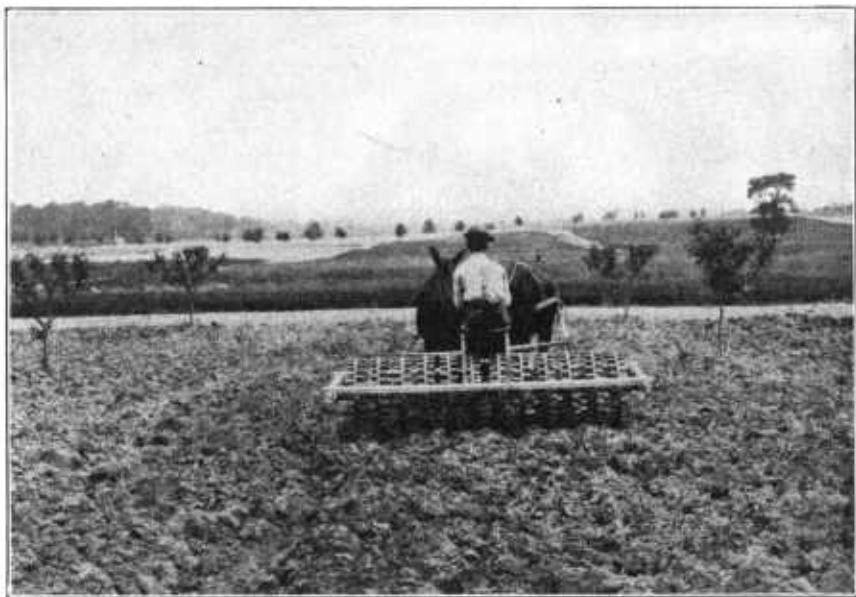


FIG. 4.—An excellent roller for pulverizing and settling the soil.

apparent that deeper plowing and better soil preparation are necessary in order that the crops may make their best growth. Barley as a grain crop will give best results if it follows some deeply plowed and thoroughly cultivated crop, such as potatoes or corn. When winter barley follows either of these crops the soil can be put in good condition by a thorough disking and cross harrowing before seeding. This gives a loose seed bed with a firmer subsoil than when the land is plowed. If cowpeas are plowed under the work should be done some time previous to sowing the barley in order to allow the soil to settle. This settling can be hastened by using a light roller followed by a spike-tooth harrow to loosen the surface. The roller, which is shown in figure 4, crushes the clods and settles the soil without compacting it, as is done by the solid roller. Cross harrowing with a disk harrow will also pack the soil, and if followed by a toothed harrow will make a good seed bed.

A good tool for use in preparing the seed bed is the plank drag (fig. 5), one of the cheapest, yet most valuable, implements on the farm. It is made by lapping 6 or 8 pieces of 2-inch plank, 8 or 10 inches wide and 6 or 8 feet long, and fastening them to crosspieces by means of bolts or spikes. This implement crushes the clods as well as levels the soil. By following with a spike-tooth harrow a fine seed bed is formed.

To secure the best results with spring barley the preparation of the soil should begin the previous fall. If the soil is heavy it should be deeply plowed in the fall and sown to some cover crop, such as clover, oats, or vetch. These crops will prevent the washing of the soil and will furnish pasture during the winter and early spring. A shallow plowing early in the spring and cross harrowing will make a good seed bed. Some seasons the soil dries out so rapidly



FIG. 5.—A plank drag used in preparing the seed bed for barley.

that it is hard to complete the spring plowing. By going over the fields with a disk harrow before plowing a mulch is formed, which will retain the moisture and prevent the soil from becoming too hard to plow. Where there is a decided tendency to wash, it will be found best to practice terracing in addition to deep plowing and the use of a cover crop. Barley should not be grown on land that is level and undrained and inclined to be wet during the winter and early spring. In such places the crop is very frequently ruined by attacks of rust.

Barley will not do well on sour soils; consequently, when a heavy cowpea or other green-manure crop is plowed under, lime should be applied at the rate of at least 25 bushels per acre to correct the acidity. In some places finely pulverized limestone has been used for this purpose with success. The results secured, however, are not as immediate as with the burnt lime, but the beneficial effect is

noticed for a much longer time. Limestone also aids in improving the physical condition of the soil. It is used at the rate of 1 to 2 tons per acre. A safe rule is to use twice as much of the ground limestone as of the burnt lime.

SOWING THE SEED.

THE KIND OF SEED TO SOW.

Care should be used in selecting the kind of seed sown. Seed grain should always be regraded and cleaned before seeding. Where no fanning mill is available the following method^a will give excellent results: Put the grain in a tub or barrel of water, leaving room enough to stir thoroughly. The plump seeds will sink to the bottom and the light seeds and most of the weed seeds will float on top and can be skimmed off and fed to stock or destroyed. The stand of barley will be largely increased by the use of this method, as the greater portion of the seeds that float will make very poor plants if they grow at all.

The use of 1 pound of formalin to 40 gallons of water when cleaning the seed will aid in preventing loss from smut. The seed should be spread out and thoroughly dried after treating.

TIME OF SEEDING.

In 1908 at the North Carolina Agricultural Experiment Station, at Raleigh, winter barley was seeded on four different dates—October 20, November 3, November 19, and December 6. The latter date gave the best results. The director of the station, Prof. C. B. Williams, states that the experiments conducted so far seem to indicate that winter barley is a promising crop in North Carolina.

At the Tennessee Agricultural Experiment Station barley was sown on seven different dates in 1901, from September 17 to November 15. The first seeding gave the largest yield of grain. In 1908 at the same station barley was seeded on four different dates, from September 17 to October 28. The first seeding again gave the best yield.

In a time-of-seeding test conducted by the Virginia Agricultural Experiment Station,^b at Blacksburg, barley was sown for four years upon four different dates—September 15, September 30, October 15, and October 30. The largest yields of grain were secured when barley was seeded near the 1st of October. From these results it is believed best to seed winter barley in eastern Tennessee and the Piedmont region of Virginia and North Carolina not later than October 1.

At the Maryland Agricultural Experiment Station and on the Arlington Experimental Farm, near Washington, D. C., the seeding of barley is generally done from September 10 to September 25. It has been sown as late as October 1, but such late seeding is not advisable in that latitude, as during an unfavorable season the plants fail to make sufficient growth to survive the winter.

The time of seeding will have to be regulated according to the locality, the elevation, and the purpose for which the crop is to be used. If intended for pasture, barley should be sown at least two

^a Circular 62, Bureau of Plant Industry, U. S. Dept. of Agriculture.

^b Circular 3, Virginia Agricultural Experiment Station.

weeks earlier than if intended for grain, so that the plants may become firmly established before pasturing commences. For a grain crop the seeding in southern Pennsylvania, Maryland, and northern Virginia should be done not later than September 25. Farther south and at lower altitudes seeding is usually done in October and November. A safe rule is always to sow the barley before the seeding time for wheat, as barley is less likely to be injured by insects than wheat.

RATE OF SEEDING.

The rate of seeding barley must be determined by the fertility of the soil and the purpose of the crop. For a grain crop it should be sown with a drill at the rate of 8 pecks to the acre. On poor soil the seeding should be less than on more fertile soil. For pasture, hay, or soiling purposes the higher rate of seeding can be used on fertile soils. In a rate-of-seeding test conducted at the North Carolina Agricultural Experiment Station barley was sown at the rate of 4, 6, 8, and 10 pecks to the acre. In this experiment the seeding of 8 pecks gave the best yield.

METHOD OF SEEDING.

There is no doubt that drilling in the seed will give the best results. Winter barley should be drilled in deeply, leaving the furrows rough after the drill. In case of heaving, due to freezing and thawing during the winter and early spring, the young plants are less likely to be injured than when the soil is made level.

So many failures have resulted from broadcasting the seed of winter barley that it is not considered wise to sow it in that way. However, as some may desire to try winter barley who do not have a drill, the following directions are given:

Prepare a good seed bed, at least 4 inches deep, and sow evenly from 10 to 12 pecks of seed to the acre. Harrow deeply so that the seed is well covered, as this is the secret of success with winter barley. Cross harrowing will distribute the seed more evenly. Fertilizers should be added to give the plants a strong, vigorous start.

HARVESTING AND THRASHING BARLEY.

The proper time for cutting barley for grain can easily be determined by pinching a kernel between the thumb and first finger. If the straw is mostly ripe and the grain can just be dented with the nail, it is in the hard dough stage and should be cut at once. If the crop is weedy, the bundles should be allowed to dry out before shocking. The shocks should be made long instead of round; this allows the air to pass through and dry them out in case of wet weather. The shocks can easily be capped by breaking the bundles over the top. As the market value of the crop is injured by allowing the grain to become discolored by dew and rain, carefully capping the shocks or placing the grain under cover is advisable.

In thrashing barley care should be taken in adjusting the concaves so that the grain is not too badly broken, as this will seriously affect the price when marketed. Barley should be thoroughly dry before thrashing and the seed must be kept in dry bins, as it will become musty if stored when damp. Musty barley fed to stock is injurious.

USES OF THE CROP.

BARLEY AS A GRAIN FEED.

Barley is nearly equal to corn in value for feeding purposes, but should not make up more than half of the grain ration for horses and cattle. For the best results in feeding to horses and cattle it should be crushed or coarsely ground, as this aids digestion and also reduces the danger of injury to the mouths of the animals from the beards. For hog feed, simply soaking the whole grain over night will suffice. The finest kind of bacon is produced from feeding ground barley mixed with skim milk. Barley is also an excellent feed for sheep. It can be fed whole or crushed. Many experiments conducted by the agricultural experiment stations and farmers throughout the North-west have demonstrated the value of barley for feeding purposes.

WINTER BARLEY FOR HAY.

Barley properly cut and cured will furnish a very nutritious hay that is readily eaten by all kinds of stock. When intended for hay it should be sown more thickly than when intended for grain. In growing winter barley for hay the mistake most commonly made is in letting the crop become too ripe in the belief that better results will be secured if the grain is allowed to fill. This is done at the expense of the stem and leaves, as much of the material from which the grain is produced is stored there. The barley is bearded, and if left too long before cutting, the beards become hard and will injure the mouths of the animals. When the crop is cut in the flowering stage the beards are soft and will be found to be less injurious than if allowed to ripen further. The crop can be cut with a mower and handled like other hay.

SPRING HOODED BARLEY FOR HAY AND SOILING.

Spring hooded barley should be sown as early as possible in the spring after the danger of severe frosts is over. The plant has a large, juicy stem and very broad, green leaves. As the heads are not bearded, this variety is preferable to the Tennessee Winter for soiling and hay-making purposes. If sown early it will grow rapidly and yield a large quantity of excellent green feed, relished by all kinds of stock. If cut when the grain is in the milk stage it will yield a large crop of nutritious hay that will give better results in feeding than will most native hays.

TABLE II.—Chemical analyses of the different crops cut for hay in the South.

Crop.	Number of analyses made.	Air-dry substance.					
		Water.	Ash.	Crude protein.	Fiber.	Carbo-hydrates.	Fats.
		<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>
barley.....	4	10.6	5.3	9.3	23.6	48.7	2.5
oat.....	12	16.0	6.1	7.4	27.2	40.6	2.7
timothy.....	60	13.2	4.4	5.9	29.0	45.0	2.5
red clover.....	38	15.3	6.2	12.3	24.8	38.1	3.3
crimson clover.....	7	9.6	8.6	15.2	27.2	36.6	2.8
etch.....	5	11.3	7.9	17.0	25.4	36.1	2.3
cowpea.....	8	10.7	7.5	16.6	20.1	42.2	2.9
soy bean.....	6	11.3	7.2	15.4	22.3	38.6	5.2

Table II^a shows the comparative value of the different crops cut for hay in the South. While too much emphasis should not be attached to such tables, owing to the difference in digestibility of the various feeds, still they give a good idea of the comparative worth of various kinds of hay.

WINTER BARLEY AS A PASTURE CROP.

Winter barley should be more widely used as a winter and spring pasture crop, as all stock eat it readily. It should be sown early in the fall with a drill, at the rate of 8 to 10 pecks per acre. When thus sown the seeds are planted deeper than when sown broadcast. The roots consequently get a firmer hold and are not so easily pulled out in feeding. Barley sown early in August makes an excellent pasture for hogs. The Tennessee Agricultural Experiment Station reports excellent growth made upon this pasture.

WINTER BARLEY AS A NURSE CROP.

Barley is without doubt the best nurse crop for grasses and clover. The shade is less dense than that of oats and wheat, and the crop ripens from eight to twelve days earlier than either. This leaves more moisture in the soil for the grass crop, and the early cutting of the barley allows the young grass plants to get well started before very hot weather.

At Berryville, Va., a correspondent seeded 15 pounds of timothy with 2 bushels of barley to the acre and secured 60 bushels of barley per acre and a fine stand of grass.

At the Tennessee Agricultural Experiment Station in 1909 the writer saw two fine examples of barley as a nurse crop. On one plat 7 pounds of alsike clover were sown with 1 bushel of barley; on the other, 10 pounds of red clover with 1 bushel of barley. They were sown in August, 1908. The open character of the barley gave the clover plants the best possible chance for growth.

WINTER BARLEY AS A COVER CROP.

One of the greatest losses of the South is due to the washing of soils (see fig. 6), large quantities of the surface soil being carried into the streams by the winter and spring rains. The muddy condition of the creeks and rivers is sufficient evidence of this fact. If the soil were properly covered with growing crops, this washing could largely be prevented. Winter barley will be found one of the best crops for this purpose. It can be sown early in the fall and covers the ground until the following summer. If it is not desired for a grain crop it can be cut early for green feed, or it can be pastured off during the winter and early in the spring before plowing for spring crops. When crimson clover fails, the land should be disked and winter barley sown, in order that the land may be covered with a growing crop during the winter and spring.

BARLEY AS AN AID IN CLEARING THE LAND OF WEEDS.

Barley is an excellent crop to clear the land of weeds. It matures early in the season before many of the weed seeds ripen. The land can then be plowed and disked, causing many of the weeds that later appear to be destroyed.

^a See Farmers' Bulletin 22 U. S. Dept. of Agriculture.

It is suggested that barley be drilled in the corn rows early in the fall, thus securing an early start for pasture or a cover crop, though no definite experiments have been made with reference to this subject.

DISEASES OF BARLEY.

The most injurious diseases of barley in the South are the rusts and smuts.

Attacks of rust are generally most severe when grain is sown late in a moist situation. This causes a soft, succulent growth, very susceptible to rust. The use of phosphate and potash in the fertilizer will insure stiffer, harder straw. By planting barley early in the spring upon well-drained soil the plants make a good growth and mature the crop before the rust becomes severe. Winter barley is less subject to rust than the spring varieties, because of its earliness.



FIG. 6.—A hillside showing the effect of erosion of soil. Winter barley makes an excellent cover crop to prevent the washing of soils.

Smut can be largely controlled by treating the seed for ten minutes with a solution made of 1 pound of formalin to 40 gallons of water. If this treatment fails, use the modified hot-water treatment, which is explained in Farmers' Bulletin 250, entitled "The Prevention of Stinking Smut of Wheat and Loose Smut of Oats," and in Bulletin 152 of the Bureau of Plant Industry, entitled "The Loose Smuts of Barley and Wheat."

INSECTS THAT ATTACK BARLEY.

Barley is attacked by many of the same insects as wheat. Among the injurious ones are the spring grain aphid, or "green bug," Hessian fly, chinch bug, and at times the army worm. As the majority of farmers are familiar with these, no description is necessary. The treatment in combating these insects on the barley crop is the same as that given when they appear on wheat.^a

^a For information regarding these insects, see the following circulars of the Bureau of Entomology of the U. S. Department of Agriculture: No. 70, entitled "The Hessian Fly;" No. 93, "The Spring Grain Aphid;" and No. 113, "The Chinch Bug."

The Angoumois grain moth and the weevils that attack the grain in the bin or seed house are probably the most serious menace to the crop in the South. Treating the seed with carbon bisulphid or hydrocyanic-acid gas will destroy these insects. Carbon bisulphid is highly inflammable, and both hydrocyanic-acid gas and carbon bisulphid are poisonous and dangerous to inhale. The methods of handling them should be thoroughly understood before their use is attempted.^a

STATEMENTS OF SOUTHERN SEEDSMEN REGARDING BARLEY

The following quotations from the catalogues of southern seedsmen show that the barley crop is considered important by the seed trade of the South at the present time:

Winter barley makes excellent winter grazing.

Winter barley is a fast grower and makes a fine pasture for stock.

Beardless barley is the earliest barley in cultivation. Grows about as high as common barley, but has stiffer straw, which enables it to stand up well. Excellent for hog feeding.

Beardless spring barley has been sown with very satisfactory results for two or three seasons past in this section (Virginia) and farther south. It makes a quick-growing crop of most excellent and nutritious green feed, and is growing in popularity wherever it is used, and will also make a good grain crop although its principal value is as an early nutritious forage crop, either to feed green or cut as hay. To cure for hay it should be cut while the grain is in the milk state. Sow $1\frac{1}{2}$ to $2\frac{1}{2}$ bushels.

Beardless barley is comparatively a new thing in the South, but growing in great favor. It is very much like the ordinary barley in grain and growth, but has the peculiarity of having no beards, an advantage that is easily seen by the planter. Another thing, it is extremely early and quick in its growth, thus affording a quick grain hay not equaled by the slower growing grains. Beardless barley is more frequently sown in the South in the very early spring, and will mature as quickly as winter barley sown in the fall.

The particular value of barley for growing in the South is for fall, winter and spring grazing, and to cut before it heads out full to use as a hay crop. In sections where it is difficult to grow the regular grasses for hay, the use of grain crops, such as barley, rye, wheat, and oats, is very desirable. All of these crops make most nutritious feed and cure up in first-class shape to take the place of hay. It should always be remembered, however, that where it is desired for this purpose these grain crops should be cut before fully headed out. Barley stools out more and really makes better fall, winter, and spring grazing than either rye or wheat. Cut for hay, it cures up splendidly and is superior in nutritive and feeding qualities to timothy hay. It is so easily grown and succeeds so well throughout the South that it should be much more largely grown than at present. It can be constantly grazed during the winter and spring, and is ready to cut two weeks ahead of wheat. It is well adapted for seeding at the last working of corn or cotton, and prevents winter leaching and washing of soils by winter rains. Sow at the rate of from $1\frac{1}{2}$ to 2 bushels per acre broadcast.

STATEMENTS OF SOUTHERN FARMERS REGARDING BARLEY.

The following are a few statements taken from a large number received from practical farmers all over the South:

Mr. R. Lee Dutrow, Frederick County, Md., says:

I have been planting winter barley for a number of years for early pasture. We find we can pasture until late in the spring without any harm to it. W

^a Full directions for fumigating with carbon bisulphid are given in Farmers' Bulletin 145, and for fumigating with hydrocyanic-acid gas in Circular 111, Bureau of Entomology, U. S. Dept. of Agriculture.

crush the grain to feed the cattle, horses, and hogs. The test of milk shows a marked increase of butter fat while feeding barley, and the cattle keep in better condition.

A correspondent tells of the following experiment in Montgomery County, Va.:

Thirty acres of barley were seeded October 1, and by November 1 a large growth was formed. From January 16 to March 1, 80 high-grade ewes and 100 lambs were turned on this barley as lambs were dropped. Barley was grazed until April 1. They were then taken off and the grain allowed to mature; it gave a yield of 20 bushels of nice grain per acre. Neither lambs nor ewes were fed grain while on the pasture. The lambs were sold in the middle of July and weighed nearly 100 pounds apiece. The thrashed grain was ground and fed as slop to shoats, and they made rapid gains. The straw was nice and soft and readily eaten by the cattle. The field was also sown to timothy and clover, both of which did well and made a good stand. We attribute the good stand of grass to the barley as a nurse crop.

Mr. B. P. Fraser, Georgetown County, S. C., says:

My experience with it is that it makes a better winter pasture than rye.

Mr. C. F. Henley, Blount County, Tenn., says:

Barley is excellent for winter pasture.

A correspondent who is making a study of agriculture in the South says:

A crop of barley followed by rape or sowed with some grass seed will furnish as much feed per acre as a crop of corn and at less expense.

SUMMARY.

Barley, although it ranks fourth among the cereals in the United States, is but little cultivated in the South for grain.

As a true awnless barley has been developed the word "hooded" is proposed for the beardless barleys now grown.

The Tennessee Winter variety is the most profitable barley to grow in the South.

Winter hooded and spring hooded barleys are grown in only a few localities in the South.

The best soils for barley, either for grain or hay, are the fertile loams and clays.

Barley requires nitrogen, phosphoric acid, and potash to perfect the grain crop. The first, which is high priced, can be largely supplied by plowing under clover and cowpeas. This leaves only the cheaper fertilizers to be purchased.

Liming the soil has proved beneficial to barley.

Seed should be carefully selected before seeding to insure a good stand. The skimming process, when properly done, gives excellent results. Seed can be treated for smut in this operation.

The seed bed must be well prepared.

Barley will succeed best after a cultivated crop.

The time of seeding barley is regulated by the locality and elevation. A safe rule in the South is to sow winter barley before sowing winter wheat.

Spring barley to succeed in the South must be sown as early as possible.

The rate of seeding depends upon the fertility of the soil and the purpose of the crop, 8 pecks being the general rate.

Drilling the crop gives the best results.

The time to harvest can be determined by the hardness of the grain. The hard dough stage is considered best.

Barley grain when crushed can be fed to all kinds of stock with the best of results.

Winter barley for hay should be cut when the grain is in the flowering stage, as the beards will then be less objectionable.

Winter barley makes an excellent cover crop to prevent the washing of the soil.

Winter barley is the best nurse crop known for clovers and grasses.

As a winter and early-spring pasture crop barley is considered superior to wheat or rye. It is readily eaten by all kinds of stock.

Spring hooded barley is not a successful crop for grain in the greater portion of the South, as it is adapted only to the higher elevations.

For a hay or soiling crop hooded barley sown early gives excellent results.

The most destructive barley diseases are rust and smut. The first can be largely controlled by early-spring planting and well-drained soil. Smut can be largely prevented by treating the seed for ten minutes with a solution made of 1 pound of formalin to 40 gallons of water.

The injurious field insects are the spring grain aphid, the Hessian fly, the chinch bug, and the army worm. The same remedies used for wheat should be applied.

The Angoumois grain moth and weevils are injurious to stored barley. Treating barley with carbon bisulphid or hydrocyanic-acid gas is beneficial.

Barley is highly recommended by seedsmen and also by farmers who have given it a careful trial.